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The Effectiveness of Animal-Facilitated Therapy in the Treatment of the Elderly Experiencing
Signs and Symptoms of Depression and/or Anxiety: An Integrative Literature Review

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Abstract

Mental illness is commonly under-diagnosed, misdiagnosed, or untreated, particularly in the elderly population. An expected population increase for those 65 years and older, increased in health care expenses coupled with the moral and ethical obligation of health care providers to promote quality of life at all ages makes investigation to alternative treatments in this population is worth investigating. The purpose of this literature review is to synthesize existing studies to clarify the following questions: What are the effects of pet therapy on those experiencing signs and symptoms of depression and anxiety? Why is pet therapy still lagging in validated studies, despite its increase in use over the years? Peer-reviewed journal articles, published within the last 10 years were selected through the databases CINAHL, psycINFO, Pro-Quest Nursing, and PubMed. A variety of terms related to pet therapy, depression, anxiety, and the elderly were used in the search process. Literature overall found pet therapy has a positive influence on elderly individuals' mental state. Pet therapy can help improve ones mental state, but evidence regarding its validated effectiveness continues to be weak. Further studies should consider more qualitative data, which will likely offer more rich and thorough insight into pet therapy's usefulness in the mental wellbeing of older adults.

Keywords: elderly, pet therapy, anxiety, depression

The Effectiveness of Animal-Facilitated Therapy in the Treatment of the Elderly Experiencing Signs and Symptoms of Depression and/or Anxiety: An Integrative Literature Review

Introduction

The population of those living to 60 years and older is increasing exponentially. Globally, it is expected that between 2015 and 2050 the proportion of those greater than 60 years old will double from 12% to 22%, and those aged 85 and older are one of the fastest growing populations (Halter, 2014, p. 565; World Health Organization [WHO], 2016). Additionally, health care expenses of the elderly are nearly four times greater than that of the rest of the population, making illness prevention and maintenance of this growing age group of utmost importance for not only nurses but also the entire health care team (Halter, 2014, p. 572). An increase in health care expenses coupled with the moral and ethical obligation of health care providers (HCPs) to promote one's quality of life (QOL) at all ages, only further necessitates adequate treatment and care for this population.

Targeting treatment toward mental health is of particular concern. Mental illness is one of the most common causes of disability, and its resultant burden is amongst the highest of all diseases (Office of Disease Prevention and Health Promotion [ODPHP], 2017). The stigma surrounding mental health and treatment, has led to a disproportionate number of individuals being under diagnosed. Additionally, those who do seek treatment are often misdiagnosed due the overlap in signs and symptoms many illnesses share (Halter, 2014, p. 66). Acute episodes of mental illness are usually followed by chronic mental illness and long-term follow up, often lasting a lifetime

Inadequate mental health is a challenge at any age. However, the elderly are particularly vulnerable. Along with stigma as a barrier to adequate treatment, HCPs find it particularly difficult to diagnose mental illness in the elderly. Those of older age commonly have physical illnesses or a dysfunction which is often chronic, that may mask or mimic those of mental illness, making misdiagnosis greater than their younger counterparts (Halter, 2014, p. 66). Additionally, the assumption that mental illness is a natural occurrence of old age is a bias some HCPs hold. Complications are only furthered, as many older individuals simply lack the ability to recognize the signs and symptoms of mental illness, leading to stagnation and often progressive worsening. Moreover, a number of changes and circumstances occurring with aging, further play a role in developing late life mental illness (Halter, 2014, p. 567; Skoog, 2011; Smith, Duell, & Martin, p. 86, 2008).

Loss of spouses, family members, and friends lead to feelings of loneliness and social isolation. Physiological changes often lead to decreased sensory functions and functional ability, which contribute to feelings of despair. Consequences of these declining functions hinder an elderly person's ability to contribute to society as they once did, which can promote feelings of emptiness. Fear of chronic illnesses and physical dependence is also common with old age. In particular, fear of falling (agoraphobia), is common in this population (Halter, 2014, p. 567; Skoog, 2011; Smith, Duell, & Martin, p. 86, 2008). Additionally, low levels of testosterone, hyper-secretion of cortisol, and under activity of the mood-regulating hormone, serotonin, leave this population particularly vulnerable (Skoog, 2011). Although certain circumstances and physiologic changes that naturally come about with old age may be a normal part of life, the mental illnesses that often accompany them are not.

Depression and anxiety are especially concerning among the elderly for a number of

reasons. Aside from being the leading cause of disability in the United States across all age groups, depression disproportionately affects the elderly (Halter, 2014, p. 251; Singh & Misra, 2009; Skoog, 2011; WHO., 2016). Along with depression, many of these individuals experience symptoms of anxiety. It is thought on average, 70% of those with depression have concurrent anxiety symptoms (Centers for Disease Control and Prevention [CDCP], 2014). While this percentage of comorbidity may fluctuate, the percentage remains high, as multiple studies have found a comorbidity of both depression and anxiety ranging between 50%-90% in old age (Byers, Yaffe, Covinsky, Freidman, & Bruce, 2010; Cairney, et al., 2007; Halter, 2014, p. 289; Gum, King-Kallimanis, & Krohn, 2009; Sigström et al., 2010, Stinson, et al., 2007; Wolitzky-Taylor, Castriott, Lenze, Stanley, & Craske, 2010. These comorbidities lead to a host of negative signs and symptoms, ultimately decreasing one's QOL, or even suicide.

Depression accounts for up to 70% of late-life suicides, while anxiety is associated with greater rates of mortality and morbidity (CDC, 2014; Tampi, 2014). Chronic medical conditions further increase the risk of depression, while 80%-86% of seniors suffer from at least one chronic medical condition, often coupled with anxiety disorder (CDC, 2012; D'Arrigo, 2013). In addition, anxiety alone or in combination with depression increases the risk of physical illness, making one's mental state consequently deteriorate their physical health (Lando, M. Williams, Sturgis, & B. Williams, 2006). With the high risk of elderly individuals being misdiagnosed, under diagnosed, or receiving ineffective drug treatment, coupled with the detrimental consequences, action towards preventing depression and anxiety while simultaneously treating those already diagnosed deserves adequate attention and investigation of non-pharmacological treatment, such as pet therapy.

In 2011, 56% of households owned a pet or multiple pets, while 63.2% of this number considered their pets to be family members (American Veterinary Medical Association [AVMA], 2013). Living in a society where many people consider their pet to be the equivalent of any family member, being placed in a healthcare setting where this familial bond will no longer exist can make an elder's healthcare experience all the more daunting. When an elderly person has possessed pets of their own and experienced that special bond with them prior to arriving to healthcare facilities, it is not uncommon for them to naturally regress through feelings of isolation, depression, and disorganization. Although the use of pet therapy among the elderly population within healthcare facilities has been on the rise, documentation regarding its effectiveness has been insufficient (E. Cherniack & A. Cherniack, 2014; Beetz, Morberg, Julius, & Kotrschal, 2012; Fine, 2015, p. 406; Kazdin, 2017; Le Roux & Kemp, 2008; MacDonald & Barret, 2015; O'Hair, 2017; Serpell, McCune, Gee, & Griffin, 2017).

Animal facilitated therapy (AFT) in nursing is more commonly termed pet therapy. Pet therapy includes animal-assisted activities (AAA) and animal-assisted therapy (AAT). Confusion among the two or lack of distinction there of, is a major issue among existing research, causing misconception. Pet Partners, one of the largest and highly accredited organizations responsible for the certification of therapy animals in the United States, provides the gold standard definition of AAT and AAA (Fine, 2006). The main distinction of the two lies in the level of formality and those guiding the human-animal interaction. Whereas AFT is a formal integrated part of a specific goal-directed treatment plan, AAA are much more spontaneous in nature, serving more as a meet and greet session in which specific goals are not its main priority. Additionally AFT is carried out by expert individuals in training, whereas AAA can be carried out by professionals, paraprofessionals, or volunteers, and their animals (Pet Partners, 2017). While the process of the

two patient-animal interactions may differ, the goal for each is similar in their intent to improve and promote a patient's "emotional, psychological, and physical well-being," thus this integrative literature review (ILR) includes studies encompassing those taking part in both AAA and AAT (Matuzek, 2010). Furthermore, the term elderly is not universally defined, but according to the WHO (2017), those 65 and older are generally accepted in most developed world countries as being defined as an elderly person.

The purpose of this paper was to investigate the effects of pet therapy on the elderly population suffering from symptoms of depression and/or anxiety within health care facilities. The goal of this IRL is provide clarity on the following questions. What are the effects of pet therapy on those experiencing signs and symptoms of depression and anxiety? Why is pet therapy still lagging in validated studies, despite its increase in use over the years? Answers to these questions are important in order to adequately validate the use of pet therapy in the geriatric population with depressive and/or anxiety symptoms. Furthermore, as a nurse, a patient must be their highest priority and therefore should investigate and promote any and all possible therapies that might improve patient satisfaction and wellbeing. The theoretical model that served as a conceptual framework for this ILR was the holistic model.

Use of a holistic model and its importance within nursing can be traced back to "The Mother of Modern Nursing" herself, Florence Nightingale. Her view that a person's health involves not only more than one's physical ailments, but instead is based on the relationship between the person and the environment, continues to hold precedence in today's nursing profession (Papathanasiou, Sklavou, & Kourkouta, 2013). Her thoughts have provided the basis of holistic nursing today, which is defined as, "all nursing practice that has healing the whole person as its goal" (American Holistic Nurses Association [AHNA], 2017, para. 1). Considering

that nursing is seen as a holistic profession, it addresses the physical, mental, emotional, spiritual, and social aspects of an individual thought necessary in understanding the many facets of patient care (Yoost & Crawford, 2015).

Complementary and alternative medicine (CAM), which is the use of medical products and/or practices not considered to be conventional medicine is often times considered holistic treatment, as it is either used along side or in place of traditional medicine with the intention of healing the whole individual. Pet therapy, considered a CAM modality, is a non-conventional way to treat a patient's mind, body, and spirit (Kramlich, 2017). Keeping in mind the holistic framework, the goal of this literature review is to provide clarity on whether or not pet therapy provides benefits to elder's experiencing symptoms of depression and anxiety, which will consequently reveal the interrelationships of the bio-psycho-social-spiritual dimensions of the elderly person as it relates to pet therapy; refer to Figure 1.

Methods

An ILR was conducted to gain clarity on the bio-psycho-social-spiritual dimensions of the elderly, with emphasis on the mind as it relates to pet therapy. This ILR synthesized findings from independent studies, which conducted quantitative, qualitative, or mixed methods (Higgins & Green, 2008; Whittemore et al., 2014). This particular review was chosen due to the relevance that multiple methodologies could offer by gaining insight to the specific research question being addressed. Unlike a systematic review, which reexamines and synthesizes studies that are solely quantitative, utilizing both qualitative and quantitative studies for this review deemed particularly important, as spirituality, a critical dimension of the holistic framework can be difficult to quantify. In addition to reviewing, critiquing, and synthesizing current research, areas

that proved more beneficial over another associated with the holistic model, could be more easily determined.

A review of literature was explored through use of data from the Cumulative Index of Nursing and Allied Health (CINAHL), PsycINFO, ProQuest-Nursing Allied Health Source, and PubMed. For each data base the following terms were used: *pet therapy* OR *animal assisted therapy* OR *"animal therapy"* OR *animal facilitated therapy* OR *animal assisted intervention* AND *geriatric* OR *aged* OR *older people* OR *elderly* OR *old age* OR *senior* OR *older adult* AND *depression* OR *depressed mood* OR *sad* OR *major depressive disorder* OR *subsyndromal depression* OR *lack of interest* OR *social isolation* OR *withdrawn* OR *fatigue* OR *despair* OR *worthlessness* OR *suicide* OR *loneliness* OR *anxiety* OR *generalized anxiety* OR *generalized anxiety disorder* OR *agoraphobia* OR *fear of falling* OR *nervous* OR *anxious* OR *worry*.

Inclusion criteria consisted of primary studies written in English, which were either quantitative or qualitative, and published in peer-reviewed journals between 2006 and 2017. Pet therapy had to be the primary intervention of the study, and only those in which all participants were aged 65 and older were considered. Participants could be either physically and mentally healthy or ill, regardless of having a diagnoses or lack there of. Specific diagnoses made by professionals pertaining to anxiety or depression was not of importance in the review process, although if they were, this was not held against the process of review. Studies simply had to have measurement outcomes *related to* anxiety and depression. Reasoning for this was due to the overlap many illnesses have with depression and anxiety (e.g. dementia and Alzheimer's). Further, specific illness or lack there of did not pertain to review criteria due to the number of under diagnosed patients, however all studies had to include either a measurement scale for depression (e.g. geriatric depression scale [GSD]), anxiety (e.g. Beck Anxiety Inventory [BAI]),

or loneliness (e.g. UCLA Scale of Loneliness), with a statistical analysis carried out. If specific scales such as those listed above were not used, questionnaires directly related to the pet therapy intervention as they relate to anxiety, depression, mood, or socialization had to be the primary outcome measurement of the study. Additionally, the setting of the studies were not of importance, and included those taking place in nursing facilities, hospitals, or other healthcare facilities.

Articles were excluded if they included animal subjects other than mammals, (e.g. robots). Further, exclusion applied if articles only mentioned pet therapy briefly, but were not the main focus of intervention. Additionally, given the confusion among the differentiation between AAT and AAI in current literature, studies included those that met guidelines for either AAT or AAI. Studies were also excluded if they were a comparison between pet therapy and another form of therapy or object. This ILR exclusively focused on pet therapy, in its own therapeutic nature, and where or not it has any affect (positive or negative) on elderly individuals experiencing signs of anxiety and depression.

Data Analysis

An initial search using combinations of the key terms yielded 426 articles. After inclusion criteria were applied, 195 articles were of potential use. Of the 195 articles, only 18 were of potential use after exclusion criteria were applied. Once duplications of articles were taken into account, a total of 11 articles were reviewed and included in this literature review. Refer to Appendix A, Table 1 for the review process and study selection.

Data was collected, analyzed, and organized based on each primary source's results. Only articles, which met the inclusion and exclusion criteria of this ILR were analyzed further. The

relevant data extracted from these articles is presented in Appendix B and categorized by the following: author and year, outcomes tested, study design, analytic tool, measurement tool, sample size, intervention description, intervention length, limitation of studies and results.

Results

Eleven studies were used for the final review during this ILR, and were first evaluated by subsets of quantitative or qualitative studies. Of the 11 studies, a tally was taken to determine which studies were quantitative, qualitative, or both. Six studies were quantitative, while five were quantitative and qualitative. Of the quantitative studies, frequency of measurement outcomes were tallied (see Table 2, Appendix A). Of the 5 studies providing some sort of qualitative data, four themes emerged (see Table 3, Appendix A). Creating both tables addressed the first research question to gain clarity on the effects of pet therapy on those experiences signs and symptoms of depression and anxiety. Another table (refer to Table 4, Appendix A) grouped the number of studies based on frequency of study limitations to answer the second research question, to address the second research questions, in order to determine what pet therapy is still lagging in validated studies despite its increase in use over the years. Systematically reviewing and comparing current research and categorizing their findings, allowed conclusions across studies to be made. Insight on pet therapy effects on elders with mental disorders considered whether or not pet therapy could be a useful holistic intervention alongside traditional medicine to aid in the mental health of elder.

Of the total quantitative studies, in which some type of reputable scale and statistical analysis was carried out, the majority of studies showed improvement in depression scores. Anxiety and QOL did not show improvement, while there was an improvement in loneliness.

Out of studies mentioning qualitative data, all showed the pet intervention to have a positive influence with no negative remarks made regarding the intervention. An overall increase in mood (e.g., feeling happy, joyous) during or after the intervention was a theme noticed most frequently out of the six studies. Socialization improved and a recall of pleasant memories was also semi-frequently noted in the studies. Although only one study asked if the pet intervention made them feel calm, nine of the 10 respondents felt it did (Morretti, et al., 2009). Refer to Appendix B for a more thorough understanding of both quantitative and qualitative study outcomes.

Regarding design limitations across studies, all 11 studies consisted of a small sample size, with the lowest being five participants and the highest being 55. Two studies were randomized controlled trials (RCTs), seven studies used at least one subjective scale as an outcome measurement (although reputable in significance), and nine studies did not follow up with results for long-term significance. One exception post follow-up intervention results included the study conducted by Prosser, Townsend, & Staiger, where general, non-statistical follow up took place (e.g. talking to staff members regarding the intervention's longer-term impact (2008). Additionally, four of the studies lacked a control group.

Discussion

Although a relatively small number of articles were found for this review, positive findings were evident. Overall, the results indicate pet therapy as a simple way of reducing feelings related to depression, anxiety, and loneliness, while improving the mental state of elderly individuals. It is apparent depression has found precedence in terms of research studies, as 10 articles focused on quantifying depression vs. the three studies for anxiety. Of merit, however, is that the majority of these findings were quantifiably significant in improving

depressive symptoms. Additionally, although anxiety was not quantifiably improved for the three studies, it is relevant to keep in mind the qualitative data these studies had to offer.

A general feeling of happiness, joyfulness, and an overall improved mood, was most steadily supported across the studies of review. Depression and anxiety include a variety of signs and symptoms, many which overlap, and while they do have their differences, the underlying state of the person is a negative one. Thus although not statistically measurable in the evidenced based sense, these positive feelings can conclusively aid those who experience anxiety and the cluster of negative symptoms associated with it. Findings of improved mood, and a sense of happiness are critical to this ILR, given the small percentage of studies that involved qualitative data. Considering all results of positive feelings, examining other data would more than likely point to only more benefits, regarding subjective data of the patient. This leads into a better understanding of the second question of for this review.

According to Denis and Beck, in addition to many published evidence hierarchies, quantitative studies are ranked higher in terms of level of evidence, while those that are qualitative rank lower (2014, p. 22-23). While the aim of this ILR was to provide the strongest evidence towards the topic of interest, the chosen methodological approach yielded a significantly small amount of studies to consider for review. Choosing to search in only highly reputable and prestigious databases, while narrowing the criteria to those only peer reviewed and published in scholarly journals, may have provided scientifically stronger evidenced based findings. However, this simultaneously left out a large amount of potentially useful and critical findings. It is important to note, articles reviewed in this ILR were mainly quantitative in nature. Those including qualitative data were not necessarily the main focus of the study, but instead only briefly mentioned. Although the evidence hierarchy is certainly a useful tool, it can be

flawed when quantitative studies, unfortunately gain more precedence in validity in the field of evidence based research. This is a critical point, which is undoubtedly a large flaw in the current research of pet therapy. Due to the qualitative studies general lack of consideration as being strongly evidenced based, this particular review supports previous findings of pet therapy to provide generally weak evidence. A number of reasons can be the cause of this.

Leading journals require that strict guidelines be followed, for study publication; many of which require the use of RCTs (Serpell, McCune, Gee, & Griffin, 2017). Unfortunately, this is something pet therapy studies, more often than not, lack. Additionally, as one prestigious researcher himself points out, many authors of studies “succumb to overwhelming urges to reduce their qualitative data to numerical categories or neat variables,” with the intention to somehow gain respect of not only journal publishers but also subsequently readers in general (Glasser, 2003). This statement seemed overwhelmingly true during this review process, as the qualitative data was of little significance from the author’s point of view and was only briefly mentioned in nearly all of the studies. Additionally, those which did not use a statistically reputable scale such as the (e.g. WHOLE-BREFF), data was grouped into general questionnaire outcomes, so percentages could ultimately be used to display the outcome of the researcher’s study intervention, regardless how small the sample size.

Lack of RCTs is perhaps the most obvious limitation of pet therapy studies. Study stipulations, medical reasons, and the bias of study participants are just a few reasons randomization is commonly not a part of the study. RCTs have become the gold standard in scientific hierarchy, as it is plausible the intervention alone produced the outcomes, rather than possible other variables (Puffer, Torgerson, & Watson, 2005; Serpell, McCune, Gee, & Griffin, 2017). Only two of the studies in this ILR were RCTs, however, one of these studies included

randomizations of participants, yet the raters were not blind as to whether participants were a part of the pet therapy group or control group, making its validity of evidence decrease. (Olsen et al., 2016).

The use of scales, which allows the person of interest to be rated by an observer, is another significant limitation noticed across all studies. Subjective bias from the observer towards the patient in a study can provide false results. On a topic such as this, these types of scales such as the MOSES scale and WHOLE-BREFF can be misleading. While both are reputable and are frequently used in evidenced based research, it still does not deem to be as truthful as a scale or questionnaire, filled out solely by the person of interest would be. This was noticeable across studies of review, as 7 of the 11 studies used these subjective (though reputable) scale measurements.

Few other limits were noted during review. While only four of the studies for this review lacked a control group, it is still a barrier to statistical evidence. Control groups allow adequate comparison of the interventions effects and are critically important. Additionally, small sample sizes were common in all of these studies, while a majority of the studies did not follow up to determine lasting post intervention effects. These frequently used research variables and methodologies, on support thee rather validity of pet therapy effectiveness. Despite the low number of studies used in this ILR, positive findings were nevertheless found to be affective in aiding elderly individuals who may from signs and symptoms of depression and anxiety. Considering this, examining other data would more than likely point to further benefits. This leads to the importance of discussing limitations for this review process.

Additional keywords within the database search could have generated more articles. Illnesses such as Alzheimer's, bi-polar disorder, and other mood or physical disorders may have

prompted more articles, as many of these illnesses possess symptoms of both anxiety and depression (Halter, 2014, p. 66). Furthermore, alternate words describing depression and anxiety, along with their signs and symptoms, may have yielded more results, such as minor depression, change in appetite, change in sleep pattern, etc. Presumably the biggest limitations of all, as it was already touched on, would be the need to include grey literature. The use of dissertations and thesis papers, for example, could have been immensely useful in discovering qualitative data. Such data is particularly valuable to this topic of interest because mental illness can be difficult to quantify and many of the characteristics of depression and anxiety are subjective feelings to the patient themselves: something a scale cannot reveal in great depth.

Significance to Nursing

An important role of the holistic nurse involves actively engaging in current research findings to explore possible areas of intervention, which can help promote one's wellbeing (Dennis & Beck, 2014, p. 24; Dossey, Keegan & Guzzetta, 2005 p. 232). Promoting the patient's wellbeing by any means necessary should be priority, as nurses are at the forefront when it comes to their patients overall state of health. In the study by Prosser, the nurses would observe and journal during and after the pet intervention. What they noticed most was an increase in mood and socialization skills. One nurse explained how nursing home residents often complained of their illness and pain, yet with the pets around this pessimistic talk was nearly non-existent. Not only that, but socialization increased dramatically, noting the patients would meet earlier than the time of intervention and reminisce about previous pets they owned, even bringing in pictures. This is just one example to show the importance nurses have when advocating for their patients. They are the ones who are most at a patient's bedside, and thus

reveal powerful input through their one on one action with the patients, making them important catalyst for advocating change. Through evidenced based research, nurses can provide information to those in their institution's policy decision making, the usefulness pet therapy interventions can provide. Doing so can increase the number of health care facilities utilizing pet therapy as an intervention.

Florence Nightingale's views have provided the goal of holistic nursing today. That is, one cannot achieve their health potential if body, mind, and spirit are not in accord. Use of the holistic framework allows nurses to fully contribute their role in aiding individual reach their fullest potential not only by addressing one area of concern, but making sure all aspects (body, mind, and spirit) of the patient are in harmony with one another. For nurses implementing and advocating for pet interventions at a health care facility it is a step in the right direction in creating therapeutic harmony for our elderly population. A simple statement by a participant in the 2013 study by Travers, Perkins, Rand, Bartlett, & Morton, may provide the simplest yet strongest evidence of all: "Seeing the dog makes me feel good; not so lonely." If pet therapy can bring a smile, joyous moment, or trigger pleasant memories for an elderly person even for a short period of time, regardless of mental state, a highly valued research design in the scientific world seems trivial. Perhaps once consensus of study efficacy is made between researchers of differing fields, that being the use of pet therapy and its positive effects on the elderly can spread. Nurses must advocate for patients, and "prove" to those higher up, the efficacy of pet therapy interventions.

Conclusion

Future research should focus on coming to a consensus among researchers, regarding study designs and efficacy of pet therapy interventions. The use of RCTs and quantitative hierarchy in the evidenced based field will seemingly continue to be a limit for future pet therapy studies. This is perhaps a large reason pet therapy is lagging in efficacy. Other methods, specifically qualitative data, provide rich information that quantitative methods simply do not provide. This bias towards numerical data was impossible to ignore during this review process.

Although pet therapy has been on the rise within the healthcare field, the insufficient amount of evidence collected in scientific literature has been weak regarding its effectiveness. This ILR found this statement to be true, as a rather small amount of studies were yielded as being strong in terms of statistical evidence hierarchies. Remarkably, this has not completely hindered hospital personal from incorporating pet therapy into practice. The positive findings this therapy lends to an elder's health, regardless of its generally weak statistical evidence, is plausibly the rationalization of pet therapy making its way into the health care field, which is supported by this review.

Appendix A



Figure 1. Holistic framework displaying the interrelationship of mind, body, and spirit necessary for achieving complete and optimal health. Adapted from Voice of Clay. Initial Breath Session Brookline. (2015). Retrieved from <https://voiceofclay.com/services/packages/wholeness-mind-body-spirit/>

Table 1

Review Process and Study Selection

Number of studies found using keywords	CINAHL	PsycINFO	ProQuest-Nursing Allied Health Source	PubMed
Number of studies found using keywords	62	87	75	202
Number of studies meeting inclusion criteria	27	23	37	108
Number of studies after using exclusion criteria	4	7	1	6
Number of studies after excluding duplications	4	5	0	2
Final number of studies reviewed	11			

Table 2

Number of Quantitative Articles Using a Measurement Tool to Quantify Specific Outcomes of the Intervention

	Depression	Anxiety	QOL	Loneliness
Total	10	3	3	1*
Improved	7*	1*	1*	1
Worsened or Stayed the Same	2	2	2*	0
Contradicting Results	1	0	0	0

Note. Articles classified as “contradicting,” referred to those describing findings in which two or more statistical measurements found opposing results. * = statistically significant results were found in the article(s) results. Of the two articles discussing QOL, one article’s results were statistically significant and another article was not.

Table 3

Number of Qualitative Articles Discussing Specific Outcome Characteristics of the Intervention

	Improved mood	Calm	Memory recall	Increased socialization
Total	6	1	3	3

Table 4

Limitations Across Studies

	Small sample size	Lack control group	RCT design	Subjective scale	Post-intervention follow up
Total number of studies	11	4	2	7	1

Appendix B
Data Synthesis of Primary Studies

Author and yr.	Outcomes tested	Study design	Measurement tool	Sample	Intervention and length	Limitations	Results
LeRoux & Kemp, 2009	Depression Anxiety Social	Quasi-experimental	BDI BAI Observation, conversation	16 (8 intervention, 8 control) Diagnoses not specified	-Interacted with leashed dog by grooming, talking, and patting whenever desired (intervention group) -Six weeks, 30 mins. one time per week	Small sample size Non-randomized No follow-up of results Short duration Participation bias	Improvement in depression score increased significantly in intervention group; no significant change in anxiety scores between intervention and control group Increased social interaction, pleasant memories
Phelps, Miltenburger, Jens, & Waddeson, 2008	Depression Mood Social	Cohort Single group (pre-post test)	GDS Geriatric PANAS Dog handler rating scale (observation) Resident follow-up questionnaire	5 Diagnosed w/depression	-Interacted and walked alone with leashed dog -Six weeks, five mins-10 mins., one time per week	Small sample size No control No follow-up Short duration Subjective scale Participation bias	No improvement in depression scores, mood, or social interaction Felt happy, enjoyed visits, looked forward to visits, interacted with dog, residents appeared comfortable during visits

Prosser, Townsend, & Staiger, 2008	Depression QOL Social	Cohort Single group (pre-post test)	GDS Resident pre-post questionnaire Staff pre-post questionnaire	18 Diagnoses differed	-Given free interaction with dogs, puppies, cats, kittens, rabbits, and guinea pigs -Six weeks, 15 hrs, one time per week	Small sample size No control General follow-up Short duration Participation bias	No improvement in depression scores from baseline Increased social interaction, verbal communication, and positive communication, mood enhanced, enjoyment, variety to life "The program made me feel good-the highlight of a predictable life."- Participant
Travers, Perkins, Rand, Bartlett, & Morton, 2013	Depression QOL	RCT	QOL-AD GDS-S MOSES SF-36 Unstructured verbal feedback	55 (19 facility A, 16 facility B, 20 facility C) Diagnoses differed	-Therapist with pet (intervention group) carried out planned activity, participants were offered to interact with the dog (play, pet and/or feed); human therapist only group followed normal therapy	Short intervention Duration of intervention differed per group Result scorers non-blinded Poorly matched control group Subjective scale	Facility A and C had worse QOL (QOL-AD) post intervention compared to control group- only facility C was statistically significant. (Outbreak of gastroenteritis may have caused decrease in group C). Group B of intervention group had significantly improved QOL compared to control group; Depression scores (GDS) improved significantly in intervention relative to control group; depression scores (MOSES)

					routine (control group) -11 weeks, 40-50 mins., three times per week (facility A), two times per week (facility B and C)		improved moderately in intervention group to those having worse baseline scores, but worsened in those with higher baseline scores- statistically significant; physical function, mental health role limitation due to physical and emotional help improved compared to control group (SF-36) but not statistically significant; bodily pain, vitality, general health perceptions worsened-all statistically significant
Vrbanac, Zečević, Ljubić, Belić, Stanin, Damir,... Damir, 2013	Loneliness Social Mood	Cohort Single group (pre-post test)	UCLA Scale of Loneliness -short version Questionn aire (post interventio n) Observati on	21 Diagnoses not specified	-Allowed to touch, play, walk, and verbally communicate with dogs -Six months, 90 mins., three times per week	Small sample size No follow- up Lack control Participation bias	Decreased perception of loneliness-statistically significant; every participant found the intervention to be pleasant, 96% showed mood improvement, 90% thought it was fulfilling Observations of participants reminiscing, sharing experiences of past pets, eagerness for intervention; increased socialization remained even after the

							intervention “By the end of the study, the group would meet earlier than the time scheduled for the therapy and would engage in free communication” –One author’s observation
Berry, Borge, Terranova, Chiaroni, Alleva, & Cirulli F, 2012	Depression Social	Quasi-experimental	GDS Scored videotape analysis	19 (nine social, four physical therapy) Diagnoses differed	-Participants of both the social interacting group and physical therapy group could interact with a dog (pet, brush, etc.), but the physical therapy group could walk the dog, while the social group sat in a circle during intervention -Five months, 60 mins., two	Small sample size Non-randomized Subjective scale Participation bias	Improvement in depression scores for both groups-statistically significant, but were not time dependent; Social behavior and spontaneous interaction with dogs increased with time-statistically significant

					times per week		
Grubbs, Artese, Schmitt, Cormier, Panton, 2016	Depression QOL	RCT	GDS-S WHOQOL-BREF	12 (seven intervention group; five control group) Diagnoses not specified	-AFT plus exercise group (intervention group) had four AAT teams during every session that exercised and interacted with the participants; control group was exercise only -Six weeks, one hr., three times per week	Small sample size No follow-up Poorly matched control group Subjective scale	Improvement in depression score improved significantly in intervention group vs. control group; no significant difference in either group for QOL score (WHOQOL-BREF) Exercise only group showed improvement in all domains, while intervention group showed a general decrease in all domains except for environmental (showed slight improvement)
Mossello, Ridolfi, Mello, Lorenzini, Mugnai, Piccini,... Marchionni, 2011	Depression Anxiety Mood	Quasi-experimental	CSDD NPI OEAR	10 (5 intervention group, 5 control group)	Offered to talk, -stroke, play, feeding brush and take for short walk (both the pet group and plush dog-control group)	Small sample size Non-randomized No follow-up Short duration Subjective scale	Decreased depression scores across AAA relative to control activity-statistical significant, but not significant in post-hoc analysis; anxiety significantly decreased throughout AAA relative to control activity-

					-Six weeks, 100 mins., three times per week	Participation bias	remained post intervention; pleasure and general alertness increased significantly during AAA and control activity compared to UDC; improved greater for AAA vs. control activity; anxiety/fear remained unchanged throughout
Tournier, Vives, & Postal, 2017	NP symptoms (depression, apathy, anxiety, etc.)	Cohort Single group (pre-post test)	NPI	11	-Encouraged to interact with and take care of dog (e.g., pet, brush, feed, talk, recall prior memories) -Five months, one hr., one time per week	Small sample size No control No follow-up Subjective scale Participation bias	Improvement in depression and sleep; depression improved significantly; anxiety, apathy, appetite/eating disorder worsened- not statistically significant
Olsen, et al., 2016	Depression QOL	RCT	CSDD QUALID	48 (25 intervention, 26 control) Participants diagnosed w/dementia or cognitive deficit	- Opportunities given to pet the dog, feed it treats, and throw a toy to play fetch -12 weeks,	Small sample size Subjective scale Participation bias	Significant improvement in depression scores in intervention group vs. control group; QOL score (QUALID) improved with intervention group and decreased with control- not statistically

					15 hrs., three times per week		significant
Moretti et al., 2009	Depression QOL	Quasi-experimental	GDS Satisfaction questionnaire	21 (10 intervention, 11 control) Dx w/depression, dementia, or psychosis	Required to hold, stroke, walk, talk, and play with dogs (intervention group) -Six weeks, 90 mins., one time per week	Small sample size No follow-up Short duration Participation bias	Improvement in depression scores increased significantly in intervention group vs. control group Depression score between group comparison showed positive effect of intervention Number of intervention group participants to who found intervention enjoyable (10/10), calming (9/10), recalled memories (1/10), recommended

Note. GDS = Geriatric Depression Scale; BDI = Beck Depression Inventory; BAI = Beck Anxiety Inventory; PANAS = Philadelphia

Geriatric Center Positive and Negative Affect Scales; NP = Neuropsychiatric; NPI = Neuropsychiatric Inventory; CSDD = Cornell

Scale for Depression in Dementia; QUALID = Quality of Life in Late-Stage Dementia; USLA = University of California, Los Angeles;

GDS-S = Geriatric Depression Scale (short form); OEAR = Observed Emotion Rating Scale; WHOQOL-BREF = World Health

Organization Quality of Life (short version); QOL-AD = Quality of Life Alzheimer's Disease; MOSES = Multidimensional Observation

Scale for Elderly Subjects; SF-26 = Medical Outcomes Study 36-Item Short Form Health Survey;

UDC = usual day care activity

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